acceptable salt thereof wherein said alternating copolymer comprises at least one residue of a first comonomer and at least one residue of a second comonomer, wherein said first comonomer comprises an α,β-unsaturated oxyacid, or an anhydride or other derivative thereof; and said second comonomer comprises an olefinic compound containing one or more polymerizable double bonds, or a derivative thereof; and

(ii) dispersing said formulation in an aqueous medium;

with the proviso that the alternating copolymer is not a copolymer of maleic anhydride and diiosbutylene.

REMARKS

Reconsideration of this application in view of the above amendment and the following remarks is respectfully requested. Claims 1-51 are pending. Claims 7-51 have been withdrawn from consideration. Claim 1 has been amended. No new matter has been added by way of this amendment.

A. Election/Restriction Requirement

Applicants thank the Examiner for acknowledging Applicants' election of Group I, claims 1-6 with traverse in Paper No. 7. Additionally, Applicants acknowledge that the Examiner has made the election requirement final, and that claims 7-51 are withdrawn from further consideration at this time.

B. Rejection of Claim 5 Under 35 U.S.C. § 112, Second Paragraph

Claim 5 stands rejected under 35 U.S.C. § 112, second paragraph for allegedly defining the expression "α,β-unsaturated oxyacids or anhydrides" so as to give it a meaning repugnant to its usual meaning. The Examiner asserts that the "first comonomers" recited in claim 1 are defined as α,β-unsaturated oxyacids or anhydrides, while claim 5, which depends from claim 1, defines the first comonomer as including various esters, amides and imides which, according to the Examiner, do not read on α,β-unsaturated oxyacids or anhydrides. To overcome this ground of rejection, Applicants note that claim 1 recites a dispersant comprising a derivative

of an alternating copolymer or an agriculturally acceptable salt thereof, and have amended claim 1 to clarify that the first comonomer is an α,β-unsaturated oxyacid, or an anhydride or other derivative thereof. Applicants have also amended claim 1 to clarify that the second comonomer is an olefinic compound containing one or more polymerizable double bonds, or a derivative thereof. Support for this amendment is found, among other places, on page 4 of the specification at lines 8-10, and on page 11 of the specification at lines 1-11.

Claim 5, then, simply narrows claim 1 in reciting specific α,β-unsaturated oxyacids and corresponding anhydrides, as well as specific derivatives thereof (*i.e.*, esters, amides and imides), for the first comonomer used to prepare the copolymer. In any case, claim 1 is reciting a derivative of an alternating copolymer, comprising comonomer residues that are derivatized. In this regard, one skilled in the art will readily appreciate that the "derivative of the alternating copolymer," recited in claim 1 can be arrived at when the comonomers that are polymerized are either derivatized or not derivatized prior to the polymerization reaction. As an example, α,β-unsaturated oxyacid or anhydride and an olefinic compound can be copolymerized and then derivatized to form the esters, amides and/or imides. Or, the monomers can be derivatized to form esters, amides and/or imides, and then copolymerized.

Accordingly, Applicants respectfully request that the above ground of rejection be withdrawn with respect to claim 5.

C. Rejection of Claims 1-6 Under 35 U.S.C. § 102

Claims 1-6 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,102,667 to Robinson et al. (hereinafter, "Robinson") and by Japanese Patent No. JP 58131903 to Kataoka et al. (hereinafter, "Kataoka '903"). Applicants respectfully traverse these grounds of rejection for the following reasons.

It is well established that anticipation under 35 U.S.C. § 102(b) requires that every element of the claims of the pending application be identically described in the asserted anticipatory reference. Applicants respectfully submit that not every element of claim 1 of the present application is identically described in Robinson or in Kataoka '903.

As to Robinson, the method thereof is a method to reduce drift of spray-applied, aqueous compositions, where the method comprises the step of adding a drift reducing additive

(including an alternating copolymer of maleic acid and a conjugated diene) to an already-prepared aqueous spray composition to enhance the formation of large, stable droplets when the composition is sprayed. Robinson describes aqueous spray compositions, to which a drift reducing additive (such as the alternating copolymer described) is added, where the composition may or may not contain water-soluble or water-suspended agrochemicals. Clearly, water-suspended (*i.e.*, water-insoluble) agrochemicals would necessarily require the use of a suitable dispersant. However, as is clear from the text at col. 4, lines 20-26 of Robinson, among other places, the alternating copolymer described in Robinson is added to aqueous compositions wherein the agrochemical is already dissolved or suspended. Thus, Robinson does not teach or describe using an alternating copolymer to disperse water-insoluble agrochemicals. Robinson only describes adding an alternating copolymer as a drift reducing additive to an aqueous composition having a water-insoluble agrochemical that is already suspended using some unknown dispersant.

Accordingly, Robinson does not describe all elements of the present invention, as embodied in claim 1. Elements of the method of the present invention include the steps of first combining a recited alternating copolymer with a water-insoluble agrochemical principal, then dispersing the combination into an aqueous medium. Thus, the method includes the step of using the alternating copolymer to disperse the agrochemical in water. Such a step is not described in Robinson. Further, Robinson does not teach, suggest, or motivate the skilled artisan to use the described alternating copolymer to disperse a water-insoluble agrochemical in water. One skilled in the art would not be motivated to use such a copolymer for such a purpose based on a teaching that such a copolymer can function as a drift reducing additive. The skilled artisan would not conclude that a copolymer would be effective for dispersing water-insoluble solids in an aqueous solution, by virtue of its being effective as a drift reducing additive – or vice versa.

For the above reasons, Applicants respectfully request that, as to Robinson, the above ground of rejection be withdrawn with respect to claim 1, and also with respect to claims 2-6, as the latter claims depend therefrom.

As to Kataoka '903, the Examiner notes that Kataoka '903 teaches aqueous compositions prepared by dispersing insoluble agrochemicals with water-soluble salts such as styrene/maleic anhydride and styrene/isobutydiene/maleic anhydride in water. The Examiner

notes that Kataoka '903 does not expressly disclose that the copolymers taught therein are alternating. However, the Examiner asserts that these copolymers would inherently be alternating due to the reactivity of the electron donating styrene or isobutydiene monomers in combination with the reactivity of the electron acceptor maleic anhydride monomers, and refers in this regard to U.S. Patent No. 3,864,319 at col. 1, lines 15-29. The Examiner further asserts that it is well known in the art that one cannot copolymerize the above electron donators with the above acceptors without resulting in essentially a 1:1 alternating coplymer. Applicants respectfully traverse this ground of rejection for the following reasons.

Applicants respectfully submit that, contrary to what is stated in U.S. Patent No. 3,864,319 at col. 1, lines 15-29, copolymers of styrene/maleic anhydride and styrene/isobutydiene/maleic anhydride are not inherently alternating and, thus, Kataoka '903 does not teach the use of alternating copolymers for dispersing insoluble agrochemicals in water. Nor is it the case that one cannot copolymerize the above electron donators with the above acceptors without resulting in essentially a 1:1 alternating coplymer.

While there is some tendency for alternating copolymers to form from the polymerization of a highly electronegative with a highly electropositive monomer, alternating copolymers do not necessarily result. This is often explained by the monomer pair complex theory. The two monomers form a charge transfer complex which then polymerizes, resulting naturally in a 1:1 alternating copolymer. However, it is known that these complexes are not very strong and, thus, direct polymerization of monomers competes with polymerization of the complex. The direct polymerization is not as ordered as the polymerization of the complex and results in a disordered copolymer.

The strength of the complex, then, has a strong influence on the degree to which the copolymer is alternating. The conditions and parameters of the copolymerization determine the strength of the complex and, hence, of the structure of the copolymer. More specifically, the temperature, solvent used, and monomer concentration are three exemplary, major variables that can be easily manipulated by the polymer chemist to achieve copolymers along the broad spectrum from 1:1 alternating to substantially disordered.

A comprehensive review of this area is given in J.M.G. Cowie, *Alternating Copolymers*. For the purpose of addressing the Examiner's concerns and providing support for

Applicants' contrary assertions regarding the above, copies of some relevant pages from this text are enclosed herewith. Many references are given therein where manipulation of copolymerization conditions results in a non-alternating copolymer (*see, e.g.,* R.B. Seymour et al., *J. Coatings Technol.* 41:612, 1976 and *Polymer* 17:21, 1976). As described in these papers, higher copolymerization temperatures can be used to yield non-alternating polymers (*see, e.g.*, page 33 of Cowie). Clearly, the polymer chemist can readily and predictably select the structure of these copolymers by manipulating various polymerization conditions. That this is true is evidenced, for example, by the ability to order from ELF-ATOCHEM three different grades of styrene:maleic anhydride copolymer. The three grades are 1:1 alternating copolymer, 2:1 styrene:maleic anhydride, and 3:1 styrene:maleic anhydride.

An element of the method of the present invention is the use of alternating copolymers as the dispersant. In fact, the present invention is based on the recognition that derivatives and salts of particular alternating copolymers can be used advantageously to disperse water-insoluble agrochemical principals in water. As explained above, Kataoka '903 does not describe the use of alternating copolymers as the dispersant, either expressly or inherently. Nor does Kataoka '903 teach or suggest, or provide motivation for, preparing the described copolymers as the alternating copolymers of the present invention. Neither does Kataoka '903 teach or suggest that there are advantages associated with using an alternating copolymer as a dispersant.

Further, Applicants note that isobutydiene is not a known monomer. It is likely that the di-descriptor refers to the "isobutyl" rather than the "ene." Thus, it should be concluded that the monomer actually referred to is diisobutylene, which has already been excluded by the proviso of claim 1 when in combination with maleic anhydride.

Finally, Applicants note that the Examiner's assertion that it is well known in the art that copolymers such as those described by Kataoka '903 are necessarily 1:1 alternating copolymers, is an assertion made without proper support. It is well established that assertions made by the Patent Office of technical facts in areas of esoteric technology must always be supported by citation to some reference work *recognized as standard in the pertinent art* (emphasis added – *see, e.g., In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA

1970)). The Examiner's assertion is in an area of esoteric technology, and the reference cited (U.S. Patent No. 3,864,319) is clearly not a work recognized as standard in the pertinent art.

For the above reasons, Applicants respectfully request that, as to both Robinson and Kataoka '903, the above ground of rejection be withdrawn with respect to claims 1-6.

D. Rejection of Claims 1-3, 5 and 6 Under 35 U.S.C. § 102

Claims 1-3, 5 and 6 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent No. JP 02111703 to Kataoka et al. (hereinafter, "Kataoka '703) or Japanese Patent No. JP 06009302 to Nabeya et al. (hereinafter, "Nabeya"), as well as by U.S. Patent No. 5,476,662 to Narayanan et al. (hereinafter, "Narayanan"). Applicants respectfully traverse these grounds of rejection for the following reasons.

As to Kataoka '703 and Nabeya, although not stated by the Examiner, Applicants assume that this ground of rejection is the same as that for the rejection of claims 1-6 under Kataoka '903. Accordingly, for the same reasons that Applicants have requested the withdrawal of the rejection of claims 1-6 under 35 U.S.C. § 102(b) as being anticipated by Kataoka '903, Applicants also request that, as to Kataoka '703 and Nabeya, the above ground of rejection be withdrawn with respect to claims 1-3, 5 and 6.

As to Narayanan, Applicants again note that it is well established that anticipation under 35 U.S.C. § 102(b) requires that every element of the claims of the pending application be identically described in the asserted anticipatory reference. Applicants respectfully submit that not every element of claim 1 of the present application is identically described in Narayanan.

One element of the method of the present invention is providing a formulation by combining a derivative of an alternating copolymer with a water-insoluble agrochemical principal. Narayanan describes using maleic acid-methylvinylether "alternating" copolymer in forming a polymer complex that also comprises a captured pesticide or herbicide. The "alternating" copolymer described by Narayanan is not a derivative of an alternating copolymer. Nor does Narayanan teach (as does the present invention) or suggest that alternating copolymers have any particular advantage over non-alternating copolymers as dispersants for water-insoluble, normally solid agrochemicals.

Another element of the method of the present invention is providing a formulation that combines a recited alternating copolymer dispersant and a finely-divided solid agrochemical principal. Claim 1 has been amended to clarify that the agrochemical principle that is dispersed in water is a finely-divided solid. Support for this amendment can be found in the specification, among other places, at page 19. lines 16-21 and at page 20, lines 6-10, where it is stated that the particle size is typically 5 to 15 microns. Also, as stated, the agrochemical solid particles are blended with solid particles of the dispersant.

In sharp contrast, Narayanan describes combining a normally liquid pesticide or herbicide with a copolymer to form a solid complex of the copolymer and captured, liquid agrochemical (for easier storage and handling of the normally liquid agrochemical). The complex is formed by dissolving both the copolymer and agrochemical in a solvent and coprecipitating the copolymer and agrochemical to form a solid complex of the copolymer and agrochemical. This is much different than the formulation provided as a step of the present invention, which is a blend of discrete solid particles of alternating copolymer dispersant and agrochemical principle – not a complex of the two.

Yet another element of the present invention is the step of dispersing the solid particles of agrochemical principal in an aqueous medium. This element is not described in Narayanan. Instead, Narayanan describes dispersing the described complex in water as a stable emulsion. An emulsion is fundamentally different than the dispersion of the present invention. By definition, an emulsion is a stable mixture of two or more immiscible liquids. In Narayanan, the normally liquid pesticide or herbicide is dispersed as liquid droplets in water. Also, as one skilled in the art would appreciate, the copolymer described by Narayanan functions as a stabilizing surfactant, or emulsifier. As such, it is partly dissolved in the liquid droplets, that is, it is absorbed into the droplet and resides at the interface between the droplet and water.

In sharp contrast, the present invention disperses solid particles of an agrochemical principle to form an aqueous dispersion of the solid, not liquid droplets of an agrochemical principle to form an emulsion. Thus, in the present invention, the dispersant is adsorbed onto the surface of a solid particle, rather than being partially dissolved into a liquid droplet. Also, in view of the above distinction, it is clear that Narayanan does not teach or suggest the importance of — or that there is any advantage associated with — using a water-

soluble copolymeric dispersant. This is because surfactants used as emulsifiers need not be water soluble. Typically, they only need to have a hydrophobic portion and a hydrophilic portion. However, where water-insoluble solid particles are being dispersed in water, the dispersant must necessarily be water-soluble. Hence, claim 1 of the present invention recites that the alternating copolymer is water-soluble.

Finally, while Narayana refers to using a maleic acid-methylvinylether alternating copolymer, Narayana actually teaches away from using alternating copolymers as defined in the present invention. In the present application, alternating copolymers are defined as copolymers synthesized from first and second comonomers, where preferably greater than 70%, and more preferably greater than 90% of consecutive comonomer residue units are not the same (*i.e.*, for a consecutive or adjacent comonomer residue pair in the copolymer, one is the residue of the first comonomer and the other is the residue of the second comonomer). Narayanan teaches away from using such alternating copolymers in describing the formula for the preferred polymer at col. 2. lines 12-41. Shown are first and second comonomer residues. One is shown as a block having from 0 to 10,000 units, preferably from 500 to 3,000 units; and the other is shown as a block having from 100 to 10,000 units, and preferably from 500 to 3,000 units. Clearly, Narayanan is describing a block copolymer that may have alternating blocks of comonomer residues, not the alternating copolymer of the present invention.

Thus, Narayanan does not describe a number of the elements of the present invention. Neither does Narayanan teach or suggest a number of the elements of the present invention, and, in fact, teaches away from an important element, as noted above. Accordingly, Applicants respectfully request that the above ground of rejection be withdrawn with respect to claims 1-3, 5 and 6.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version With Markings to Show Changes Made.**"

In view of the above amendments and remarks, allowance of claims 1-6 is respectfully requested. A good faith effort has been made to place this application in condition for allowance. However, should any additional issue require attention prior to allowance, the Examiner is requested to contact the undersigned at (206) 622-4900 to resolve the matter.

Respectfully submitted,

Seed Intellectual Property Law Group PLLC

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Enclosures:

J.M.G. Cowie, *Alternating Copolymers* (Title page, pages 18-21, pages 32-35 and pages 70-71)

(JAM:cew) #313227

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claim 1 has been amended as follows:

1. (Amended) A method of dispersing an active, finely divided, water-insoluble, solid agrochemical principal in an aqueous solution comprising the following steps:

(i) providing a formulation comprising at least one active, finely divided, water-insoluble, solid agrochemical principal and at least one dispersant comprising a ~~water~~ water-soluble, agriculturally acceptable derivative of an alternating copolymer or an agriculturally acceptable salt thereof wherein said alternating copolymer comprises at least one residue of a first comonomer and at least one residue of a second comonomer, wherein said first comonomer comprises an α,β-unsaturated ~~oxyacids~~ oxyacid, or an anhydrides or other derivative thereof; and said second comonomer comprises an olefinic compounds containing one or more polymerizable double bonds, or a derivative thereof; and

(ii) dispersing said formulation in an aqueous medium;

with the proviso that the alternating copolymer is not a copolymer of maleic anhydride and diiosbutylene.